

**Department of Mathematical Sciences  
CARNEGIE MELLON UNIVERSITY**

**To:** MCS College Council  
**From:** Russell C. Walker, Associate Head  
**Date:** August 2, 2004  
**Subject:** New course for Architecture students

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Freshman Architecture majors have been taking 21-120 Differential and Integral Calculus in their first semester. It is taken primarily to prepare for 33-106 Physics for Engineering Students I in the second semester of their professional program to prepare architects.

The School of Architecture has asked the Mathematical Sciences Department to develop a mini course providing the calculus background for 33-106 to replace 21-120. Their request is motivated by an upcoming shift in accreditation standards for architecture programs that reduces the permitted percentage of required units.

To meet the request from Architecture, we propose to introduce a mini course designed specifically to prepare Architecture students for the physics and statics courses that they must take. The description of the proposed course follows. It includes the essentials for physics as well as key applications of calculus.

**21-114 Calculus for Architecture**

Fall, Second Mini: 5 units

This course focuses on the calculus topics needed by architecture students in their subsequent courses. Functions, limits, derivatives, algebraic, exponential, and trigonometric functions; curve sketching, Mean Value Theorem, maximum-minimum problems, definite and indefinite integrals, integration by substitution. 3 hours lecture, 2 hours recitation. Sections in *Stewart*: 1.1-3, 1.5, 2.1-9, 3.1-7, 4.1-3, 4.5, 4.7, 5.1-5.

Text: Stewart, *Calculus*, Early Transcendentals, Fifth (2003) Edition, Brooks/Cole.

Architects participating in the BSA program would continue to take 21-120 Differential and Integral Calculus. Architects with a 5 on an AP Calculus Test would receive AP credit for 21-120.

Students who identify themselves as considering majors other than Architecture should be counselled to take 21-120 instead.

**Implementation issues.**

This Fall the Mathematical Sciences Department is introducing a Cocalculus course designed to parallel the first half of 21-120 Differential and Integral Calculus and help those students who appear to need it based on the Placement Test.

Students who have scored near the bottom on basic skills part of the test will take this course in the first half of the semester. Our plan is to also give the basic skills portion of the Placement Test in the second meeting of 21-120 and 21-121 to identify any students who may need the assistance of Cocalculus but who did not take the Placement Test. Because most Architects will not be in either course, we will need to arrange to give the test to students who did not submit a test.

For Fall 04 we will use the two existing recitations scheduled for TR 9:30 for 21-120 Differential and Integral Calculus to accommodate the architects. We anticipate that the lecture will meet MWF at 9:30 in a classroom controlled by the School of Architecture.